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No. 64. Evidently an error of determination or of locality, as no other collection of this species had been made in Missouri, and I suspect Pech had mistaken for this species either *H. chrysophyllum* Brid. or *H. hispidulum* Brid., neither of which, though very common, are listed by him. Another fine species of *Hypnum*, *H. curvifolium* Hedw., so common on rocky ground in Eastern Missouri, and *H. Patentiae* Lindb., of similar situations and range, appear to have been overlooked by Pech.

No. 65. Evidently intended for *Rhynchostegium serrulatum* L. & J., and very likely correct, as this species is common on the ground in woods throughout the State. Another species of *Rhynchostegium*, *R. deplanatum*, Schimp., common in similar situations, does not seem to have been collected by Pech.

No. 66. Evidently intended for *Pylaisia polyantha* (Schreb.) Br. & Sch., now known as *Pylaisiella polyantha* (Schreb.) Grout, but very doubtful, as this is a species of the Northern and Eastern states, and no other specimens are known from Missouri.

COURTNEY, MISSOURI.

MOSSES, HEPATICS, AND LICHENS OF THE QUARTZITE HILLS OF THE KAMOURASKA FORMATION, QUEBEC, CANADA

FR. M.-VICTORIN

In the counties of Montmagny, l'Islet, Kamouraska and Temiscouata, the St. Lawrence lowland is broken by a few sharp elevations that can hardly fail to attract the attention of the passing tourist on account of their very peculiar shape. The rocks of this formation have been of late studied by Mr. John A. Dresser of the Geological Survey[1] and provisionally separated from the Sillery in which they were included.

The Kamouraska formation as it is now commonly called, consists in a series of detached hills which are seldom more than 300 feet high and a couple of miles in length, and most of them are much smaller. In the ground plan they are much flattened ellipses, the longer axes running in a northeasterly direction. In structure they are sharply folded anticlines, slightly overturned towards the northwest, giving a general dip to the southeast of about 75°. They are also domed so as to give a pitch of 15° or 20° to the northeast and southwest near the ends of many of the hills. The course of the chief glaciation has been nearly at right angles to the trend of these ridges, and the central parts of some of the domes have been broken away by the ice, leaving the extreme ends of a hill pitching away from each other, sometimes separated by a drift covered interval. The Gros Pèlerin Island offers a good example of an ice-notched dome.

The Kamouraska quartzite is fine, even-grained, light-colored, and weathers to an almost pure white, very striking in the landscape. Quartz is usually the only mineral that can be distinguished in the hand specimen, but in places the quartzite contains nodules of dolomitic sandstone. These nodules disintegrate more rapidly than the quartzite under the action of the atmosphere, and give a pitted surface in exposed places. Interstratified with the quartzite above described are beds of conglomerate from a few inches to 25 feet in thickness. The matrix of the conglomerate is a dolomitic sandstone and the included pebbles are limestone, slaty sandstone, quartz, and occasionally granite, apparently Laurentian.

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[1] John A. Dresser. Reconnaissance along the National Transcontinental Railway in Southern Quebec. Geol. Surv. Canada, Memoir No. 35. 1912.

No botanical work has been done up to the present time on these peculiar hills, except the collecting of a few Phanerogams by Penhallow.[1] The writer has had the opportunity to collect both Phanerogams and Cryptogams during the season of 1913 and 1914 on the easternmost representatives of the group in Temiscouata: the Hospital Hill and Mt. Pilot at Rivière-du-Loup; several unnamed hills at St. Arsene and Cacouna; and two of the Pilgrim Islands: "Gros Pèlerin" and "Pelerin du Milieu."

The object of this paper will be to give a brief account of the mosses, hepatics, and lichens of this particular habitat.

The quartzite hills bearing but few and dwarfed trees and being but huge masses of snow-white rocks, maintain typical xerophytic associations of plants, and for this reason the Mosses and Hepatics are comparatively scarce. The Lichens are the plants best adapted to such dry situations and, as a matter of fact, they are numerous both in species and individuals. *Cladonia* is richly represented and almost all American species of *Gyrophora* can be found. The following is a list of the species of Cryptogams recorded and whose identity has been ascertained.

MOSSES

Amblystegiella adnata (Hedw.) Nichols. Gros Pèlerin Island. This plant is very variable according to habitat but is readily distinguished from closely related species by its rhombic cells.

Anomodon attenuatus (Schreb.) Hueben. Gros Pèlerin Island: Mt. Pilot. Very common.

Anomodon rostratus (L.) Hedw. Mt. Pilot. This Anomodon is a remarkable feature at the base of the quartzite hills, and its ecology is worthy of some attention. It has been stated above that the quartzite beds have a general dip to the southeast of about 75°. It ensues that the northern face is not only steep and precipitous, but very often overhanging, thus inducing the formation of a damp and sheltered belt at the foot of the cliff. There, *Anomodon* finds its optimum life conditions, and it thrives to an extent unknown elsewhere, forming uninterrupted velvet underneath the slanting quartzite beds. It is also interesting to observe the mode of growth, which is well disclosed at the edge of the extensive patches. The primary stem runs along a strictly straight line, issuing but very few short flagelliform branches, and tightly clinging to the substratum by means of its sucker-like rhizoids. But as the mat thickens with age it can be easily removed, probably owing to the partial destruction of the deeper parts which are then deprived of light.

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[1] D. P. Penhallow. Flora of Cacouna. Can. Rec. of Science **4**: 369.

Bartramia pomiformis (L.) Hedw. Mt. Pilot. A very beautiful moss with peculiar globose capsules not met often in this habitat. It prefers the damp walls of river cliffs. Common in the Laurentide district.

Calliergon Schreberi (Willd.) Kindb. Rivière-du-Loup. Quartzite hills. A ubiquitous moss that can live in very dry places.

Dicranella heteromalla (L.) Schimp. Mt. Pilot. *Dicranella* is typical on the quartzite hills, while at a very short distance, on the seashore cliffs it passes to the variety *orthocarpa* (Hedw.) E. G. B. which is the alpine form of the species.

Dicranum undulatum Ehrh. Mt. Pilot. Common.

Drepanocladus uncinatus (Hedw.) Warnst. Gros Pèlerin Island. Common. The species of *Drepanocladus* are generally water-loving. *D. uncinatus* is less exacting as to moisture. *D. vernicosus* (Lindb.) Warnst., and *D. Wilsoni* (Sch.) Roth., are also met in the region but not on the quartzite hills.

Grimmia apocarpa (L.) Hedw. Gros Pèlerin Island. Fruiting on the boulders of the seashore.

Hedwigia albicans (Web.) Lindb. Mt. Pilot. This moss on account of its xerophytic adaptations is the leading form of plant life on the quartzite hills. It spreads on extensive ledges where absolute siccity prevails.

Hypnum fertile Sendt. Gros Pèlerin Island. This moss is common in this habitat, though it is rare elsewhere, and its presence seems to be conditioned more by the subarctic factors of the seashore than by the quartzite-hill habitat itself.

Hypnum imponens Hedw. Gros Pélerin Island. Growing very luxuriantly in this locality.

Hypnum pallescens (Hedw.) B. & S. Gros Pèlerin Island. What has been said of *H. fertile* applies to this arctic-alpine moss which is sometimes considered as the northern form of *H. reptile* Mx.

Leskea polycarpa Ehrh. Gros Pèlerin Island. Common.

Leucodon sciuroides (L.) Schwaegr. Gros Pèlerin Island. Abundant there. This moss is very seldom collected.

Myurella Careyana Sulliv. Gros Pèlerin Island. This is an uncommon moss, growing chiefly on calcareous rocks. The products of the disintegration of the dolomitic nodules included in the quartzite, could perhaps account for the presence of *Myurella* on Gros Pèlerin Island.

Neckera pennata (L.) Hedw. Mt. Pilot.

Pohlia cruda (L.) Lindb. Gros Pèlerin Island. Growing with *Myurella Careyana*, and having the same preferences for limestone. It is considered as a subalpine species.

Polytrichum commune L. var. *uliginosum* Huebener. Mt. Pilot. This variety characterized by its leaves which are spreading-reflexed when dry is characteristic of peat bogs and high altitudes. It is considered as rare outside of the Rocky Mountains and the Pacific Coast. Its presence in Eastern Quebec is indeed worthy of record.

Sphagnum capillaceum (Willd.) Schrank. Gros Pèlerin Island.

Ulota crispa Brid. Gros Pèlerin Island. On trees.

HEPATICS

Frullania Asagrayana Mont. Mt. Pilot; Gros Pèlerin Island. Though we have collected *Frullania* extensively in Temiscouata, all our specimens have turned out to be *F. Asagrayana*. It is a remarkable fact that *F. Eboracensis*, so common in western Quebec and in the Laurentides, is missing here.

Porella platyphylla (L.) Lindb. Mt. Pilot. Common.

Ptilidium ciliare (L.) Nees. Mt. Pilot. On rocks.

Ptilidium pulcherrimum (Web.) Hampe. Mt. Pilot. Very common.

LICHENS

Alectoria jubata (L.) Ach. Gros Pèlerin Island. Growing with *Usnea dasypoga*.

Cladonia alpestris (L.) Rabenh. Cacouna hills; Mt. Pilot. This boreal species is closely related to the ubiquitous *C. rangiferina* L., but its powdery snow-white balls render it of easy recognition.

Cladonia coccifera (L.) Hoffm. Rivière-du-Loup. Quartzite hills. On rocks.

Cladonia decorticata (Flk.) Spreng. Gros Pèlerin Island).

Cladonia fimbriata (L.) Fr., var. *cornuta* Nyl. Gros Pèlerin Island.

Cladonia foliacea (Huds.) Schrad., var. *alcocornis* (Light.) Schaer. Mt. Pilot. Confined to silicious rocks.

Cladonia furcata (Huds.) Scrad., var. *pinnata* (Flk.) Wain. Gros Pèlerin Island.

Cladonia gracilis (L.) Willd., var. *gracillima* Norrl. Rivière-du-Loup, on quartzite hills. Gros Pèlerin Island. In very dry situations. A very luxuriant form is this fine species.

Cladonia rangiferina L. Rivière-du-Loup, on quartzite hills; Mt. Pilot; Gros Pèlerin Island; Cacouna, on quartzite hills. The commonest of Cladonias.

Cladonia uncialis (L.) Web. & Hoffm. Mt. Pilot; Gros Pèlerin Island.

Cladonia verticillata Hoffm. Rivière-du-Loup, on quartzite hills; Mt. Pilot. Cosmopolitan.

Gyrophora erosa (Web.) Ach. Rivière-du-Loup, on quartzite hills.

Gyrophora hyperborea Ach. Mt. Pilot. Arctic-alpine species.

Gyrophora Muhlenbergii Ach. Rivière-du-Loup, on quartzite hills.

Gyrophora vellea (L.) Ach. Mt. Pilot. An alpine species. No other locality known in eastern Quebec. Occurs in the Monteregian Hills.

Nephroma arctica (L.) Fr. Gros Pèlerin Island. We have found splendid fruited specimens of this large arctic-alpine Lichen, on exposed rocks. It was growing with other distinctly boreal plants such as *Hypnum pallescens* and *Cornus Suecica*.

Parmelia saxatilis (L.) var. *furfuracea* Schaer. Mt. Pilot; Gros Pèlerin Island. Both typical *P. saxatilis* and its variety were recorded from both localities.

Peltigera aphtosa (L.) Hoffm. Gros Pèlerin Island. Growing with *Nephroma arctica.*

Peltigera canina (L.) Hoffm. Gros Pèlerin Island. Common.

Physcia pitynea Nyl., var. *pulverulenta* (Schrad.) Nyl. Rivière-du-Loup, on quartzite hills.

Ramalina farinacea (L.) Ach. Gros Pèlerin Island. This species is now known from Alaska to Mexico, and from Labrador to the Carolinas.[1]

Umbilicaria pustulala (L.) Hoffm. Mt. Pilot. Growing with the different types of *Gyrophora.*

Usnea dasypoga (Ach.) Nyl. Gros Pèlerin Island. On trees. Characterized by its fibrillose thallus.

For various information and the critical study of some of the specimens mentioned above, the writer owes much indebtedness to Rev. H. Dupret, p. s. s., of the Seminary of Philosophy, Montreal, to Mr. Geo. B. Kaiser, of Germantown, Pa., to Dr. Geo. H. Conklin, of Superior, Wisc., and to the late Dr. H. E. Hasse, of Santa Monica, Cal. To all these he extends his most sincere thanks.

LONGUEUIL COLLEGE, QUEBEC.

ADDITIONAL NOTES UPON NEW MEXICAN HEPATICAE [2]

PAUL C. STANDLEY

The list of New Mexican Hepaticae published recently by the writer in THE BRYOLOGIST[3] was based upon material obtained by various collectors in the last few years. It was not deemed practicable to search out the references in literature because the publications upon North American Hepaticae are so scattered and the New Mexican material available for citation so scanty. Dr. A. W. Evans, however, has kindly communicated certain New Mexican references which make a very considerable addition to the published list. It seems desirable that these additions should be recorded.

Grimaldia fragrans (Balb.) Corda. Underwood[4] reports this from New Mexico, the specimen collected by Fendler, no definite locality being given. Some of Fendler's plants (1846–47) were collected in Kansas and Oklahoma, although all the labels are headed New Mexico. It is very probable that this specimen came from the mountains east of Santa Fe where Fendler obtained most of his plants.

Asterella fragrans (Nees) Trevis. This species, likewise, is reported from New Mexico by Underwood[1] upon the basis of one of Fendler's specimens, no definite locality being cited.

Lophozia lycopodioides (Wallr.) Cogn. Collected in the Las Vegas Range at an altitude of 3300 meters by Cockerell.

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[1] R. H. Howe, Jr. North American Spcies of Ramalina. BRYOLOGIST **17:** 2. Jan. 1914.

[2] Published by permission of the Secretary of the Smithsonian Institution.

[3] **18:** 81–83. 1915.

[4] Bot. Gaz. **20:** 68. 1895.